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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/730,430	12/08/2003	David G. Fullington	03AB237 (110003.00068)	2325

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EXAMINER

THOMAS, LUCY M

ART UNIT	PAPER NUMBER
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2836

DATE MAILED: 12/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/730,430	Applicant(s) FULLINGTON ET AL.	
	Examiner Lucy Thomas	Art Unit 2836	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 May 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-17 and 24 is/are pending in the application.
- 4a) Of the above claim(s) 5,16 and 17 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3,4,6-15,24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date. _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Remarks

1. Since this application is eligible for the transitional procedure of 37 CFR 1.129(a), and the fee set forth in 37 CFR 1.17(r) has been timely paid, the finality of the previous Office action is hereby withdrawn pursuant to 37 CFR 1.129(a). Applicant's Amendments After Final submission after final filed on 11/10/2006 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 3, 7, 8, 9, 11, 15, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schwesig (US 6,573,681) in view of DeDecker et al. (US 5,904,666). Regarding Claim 1, Schwesig discloses a drive circuit (Figures 1, 2) for delivering high-level power to a load M, the drive circuit comprising: a high power circuit W including a set of semiconductor switching devices T1-T6 capable of being coupled to the load and delivering the high level power thereto; a logic circuit ST generating signals to control the semiconductor devices; a low power circuit (A excluding logic circuit, I1, and I2) to transmit the signal from the logic circuit to the high power circuit, only when the low power circuit is receiving electrical power; and a safety circuit (see SH1, SH2 to I1, I2 respectively and IL1, IL2 to SV) to control the application of power to the low power circuit (see different circuit portion of A in Figures 1, 2, Column 1, lines 7-11, Column 3,

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lines 49-67, Column 5, lines 6-11). Schwesig is silent regarding the safety circuit being electrically independent of the logic circuit. DeDecker teaches a safety circuit electrically independent (see secondary watchdog circuit disclosed in Column 10, lines 51-58) of a logic circuit 24 (see microprocessor 24 in Figure 4). It would have been obvious to those skilled in the art at the time the invention was made to modify the safety circuit of Schwesig and provide the safety circuit electrically independent of the microprocessor as taught by DeDecker, to shutdown the motor in case of microprocessor malfunction and thus to provide redundant protection to ensure power is removed from the motor (DeDecker, Column 10, lines 54-55).

Regarding Claim 3, Schwesig discloses the drive circuit, wherein the safety circuit is a safety relay (see SH1, SH2) that is coupled to a power terminal of the low power circuit, and wherein the safety relay decouples the power terminal of the low power circuit from a power supply in order to disable the low power circuit (Column 4, lines 35-44).

Regarding Claim 7, Schwesig discloses the drive circuit, wherein the safety circuit is coupled to an override port of the low power circuit, and wherein the safety circuit portion disables the low power circuit by providing a first signal to the override port of the low power circuit (see SV1_Diag and SV2_Diag in Figures 1 and 2).

Regarding Claim 8, Schwesig discloses the drive circuit, wherein the safety circuit includes a hardware switch S1, S2 that is capable of being switched between first and second states, and wherein when the switch is switched in the first state, the second circuit provides the first signal to the override port of the first circuit (Column 4,

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lines 23-35). Regarding Claim 9, Schwesig discloses the safety circuit except the reference does not show a NOR gate as recited. It is known in the art that an art recognized equivalent circuit can be provided which alternatively provides a NOR gate.

Regarding Claim 11, Schwesig discloses the drive circuit, wherein the low power circuit includes an inverter circuit N1, N2, and a buffer circuit L1-L4 (Column 3, lines 58-63, Column 5, lines 12-29).

Regarding Claim 15, Schwesig discloses the drive circuit, wherein the high power circuit includes a plurality of high power transistor devices T1-T6 that are light-actuated and a plurality of photodiodes (see photodiodes in OK1-OK6) receive the at least one control signal from the lower power circuit, and wherein the high power transistor devices are electrically isolated from the photodiodes (Column 3, lines 52-55, 66-67).

Regarding Claim 24, Schwesig discloses a motor drive circuit (Figures 1, 2) for delivering high-level power to a load M, the drive circuit comprising: a high power circuit W including a set of semiconductor switching devices T1-T6 capable of being coupled to the load and delivering the high level power thereto; a logic circuit ST generating signals to control the semiconductor devices; a low power circuit (A excluding logic circuit, I1, and I2) to transmit the signal from the logic circuit to the high power circuit, only when the low power circuit is receiving electrical power; and a set of ports exposed by the drive allowing connection of a safety circuit(see SH1, SH2 to I1, I2 respectively and IL1, IL2 to SV) to control the application of power to the low power circuit (see different circuit portion of A in Figures 1, 2, Column 1, lines 7-11, Column 3, lines 49-67, Column 5, lines 6-11). Schwesig is silent regarding the safety circuit being electrically

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independent of the logic circuit. DeDecker teaches a safety circuit electrically independent (see secondary watchdog circuit disclosed in Column 10, lines 51-58) of a logic circuit 24 (see microprocessor 24 in Figure 4). It would have been obvious to those skilled in the art at the time the invention was made to modify the safety circuit of Schwesig and provide the safety circuit electrically independent of the logic circuit as taught by DeDecker, to shutdown the motor in case of logic circuit malfunction, and thus to provide redundant protection to ensure power is removed from the motor (DeDecker, Column 10, lines 54-55).

4. Claims 4, 6, and 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schwesig (US 6,573,681) in view of DeDecker et al. (US 5,904,666) and Rowlette (US 5,806,440). Claim 4 differs from Claim 3 only in that the safety circuit is coupled to a pull-up resistor of the first circuit portion instead of power terminal of the first circuit. Schwesig or DeDecker does not disclose a pull-up resistor of the first circuit. Rowlette discloses a pull-up resistor R23 (Figure 2c) coupled to the safety relay K4 (Column 6, lines 55-65). It would have been obvious to those skilled in the art at the time the invention was made to modify the combination of Schwesig and DeDecker and to include a pull-up resistor as taught by Rowlette, because pull-up resistors are used in the art to provide a default logic HIGH for additional safety of the circuitry. Regarding Claim 6, Rowlette discloses the safety relay with normally-open contact, and normally-closed contact, wherein the contacts are physically coupled (see relays K1, K2 in Figure 2c, Column 9, lines 30-35). Rowlette's relay is used in a heating device (furnace), but would necessarily perform the recited function of Claim 6, when configured as above.

Regarding Claim 13, Schwesig discloses an inverter circuit coupled to the buffer circuit (see N1, V1 and N2, V2 in Figures 1, 2). The remaining part of Claim 13 recites the configuration including the pull-up resistor and safety relay recited in Claim 4, and the inverter. Claim 14 adds the limitation of an additional pull-up resistor in the configuration recited in Claim 13, further including the third circuit portion. It would be obvious to provide an additional pull-up resistor that is coupled to the third circuit, because the pull-up resistor can act as a load and keep the output at logic HIGH for additional safety of the circuit.

5. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schwesig (US 6,573,681) in view of DeDecker et al. (US 5,904,666) and Sato (US 6,775,115). Regarding Claim 10, Schwesig or DeDecker does not disclose at least one coil that outputs a signal indicative of a current delivered by the high power circuit to the load, and wherein a determination is made regarding whether the signal indicative of the current is proper when the switch is switched in the first state. Sato discloses drive circuit for a motor 16 (Figures 1 and 6), wherein a high power circuit 14 includes at least one coil 24a-c, that outputs a signal indicative of a current delivered by the high power circuit to the load, and wherein a determination is made regarding whether the signal indicative of the current is proper when the switch is switched in the first state (Column 5, lines 28-54, Column 6, lines 63-65). It would have been obvious to those skilled in the art at the time the invention was made to modify the combination of Schwesig and DeDecker and to include a coil as a current sensor as taught by Sato for additional safety of the motor.

6. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Schwesig (US 6,573,681) in view of DeDecker et al. (US 5,904,666) and Wilson (US 5,764,024). Regarding Claim 12, Schwesig discloses the drive circuit, wherein when the low power circuit is not disabled, the logic circuit outputs a plurality of preliminary signals to the inverter circuit, the inverter circuit converts the plurality of preliminary signals into a plurality of modified signals, and the buffer circuit provides the at least one control signal in response to the plurality of modified signals. Schwesig or DeDecker does not disclose that each of the preliminary signals, the modified signals, and the at least one control signal is a pulse width modulated (PWM) signal. Wilson discloses a plurality of signals G1, G2 which is pulse width modulated signal in a motor drive circuit 100 for a three phase motor U (Figure 3). It would have been obvious to those skilled in the art at the time the invention was made to modify the combination of Schwesig's and DeDecker and to provide pulse width modulated signal as taught by Wilson, because pulse width modulation is used to control the speed and operation of the motor by modulating the pulse width of the signals.

Response to Arguments

7. Applicant's arguments filed on 5/30/2006 and 11/10/2006 have been fully considered.

Applicant's arguments regarding the safety circuit being electrically independent of the logic circuit is rendered moot in view of new grounds of rejection.

The Applicant states that regarding Claim 3, Schwesig teaches away from the invention. Schwesig discloses the safety-relay signals SH1, SH2 applied to the system

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I1 and I2 respectively (Column 4, lines 37-39), and each system I1 to I2 includes a controller such as microprocessor, microcontroller, ASIC or other control units (Column 3, lines 58-63), and the drive unit ST outputs the drive signals for the transistors, and can be a separate unit or a subsystem within I1 (see Column 3, lines 63-66). Therefore, signal is tested by the components of the system I1, I2, as the components of the controller other than the microprocessor of the invention.

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lucy Thomas whose telephone number is 571-272-

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6002. The examiner can normally be reached on Monday - Friday 8:00 AM - 4:30 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Sircus can be reached on 571-272-2800 x36. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LT
November 28, 2006



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